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the jar along with the cultures of the abortion bacillus. The appearance of the colonies is characteristic, and coupled with the behavior toward oxygen is almost sufficient for identification. Subcutaneous injection of active cultures into pregnant guinea-pigs causes abortion with great regularity.

Of the various names employed to designate the organism, *Bacillus* (or *Bacterium*) *abortus* Bang, is considered as the correct and appropriate one.

*A Method for Determining the Germicidal Value and Penetrating Power of Liquid Disinfectants:*

ARTHUR I. KENDALL and MARTIN R. EDWARDS.

The method consists essentially of infecting plain agar with 24-hour cultures of *B. coli*, hardening the agar in sterile tubes of 1.5 cm. inside diameter and about 1 meter long, then cutting cylinders from the hardened agar by running it out slowly and sectioning it transversely into cylinders of about 2 cm. long with a sterile knife. The cylinders so obtained are dropped directly into the disinfecting solutions which it is desired to examine, and into 5 per cent. carbolic acid as a standard for comparison. Cylinders from each solution of disinfectant are removed at the end of stated intervals, washed in distilled, sterile water, and then a core removed from the center of each cylinder along the long axis by means of sterile quill tubing (3 mm. in diameter).

These cores so removed are placed in lactose fermentation tubes and incubated at body temperature for several days, making daily examinations for gas formation.

By comparing the results obtained with the various disinfectants with those of the standard carbolic acid, it is possible to formulate a coefficient which expresses the combined germicidal and penetrating power of the disinfectant in question with that of carbolic acid.

All abstracts have been supplied by authors unless otherwise stated.

CHARLES E. MARSHALL,  
Secretary

EAST LANSING, MICH.

#### SOCIETIES AND ACADEMIES

##### THE PHILOSOPHICAL SOCIETY OF WASHINGTON

THE 690th meeting was held on February 25, 1911, President Day in the chair. Two papers were read:

*Some Causes of Variations in the Polarization of Sky Light:* Dr. H. H. KIMBALL, of the U. S. Weather Bureau.

The first part of this paper contained a brief résumé of the main features of sky polarization, together with references to some of the theories that have been advanced to account for them. Observations by different investigators were cited to illustrate the character of periodic variations in sky polarization, and a summary was given of observations by the author. These latter include measurements of the percentage of polarization at the point of maximum, *i. e.*, 90 degrees from the sun and in its vertical, as well as observations on the position of the neutral points of Arago and Babinet. They show (1) variations in sky polarization with place, apparently due principally to differences in the intensity of reflection from the surface of the earth, and (2) variations with meteorological conditions.

No connection is apparent between sky polarization and the pressure exerted by the aqueous vapor contained in the atmosphere. Dustiness, or any form of mechanical haze, decreases the percentage of polarization; but by far the most potent cause of such a decrease appears to be optical haze, or the diffusion of light by reflection from the boundary surfaces of non-homogeneous layers or currents of air.

All of the observations included in the above summary were obtained when the sky was practically cloudless. Of the ten days on which the lowest percentage of polarization was observed seven were followed by rain before midnight of the succeeding day.

*The Nature of the Sun:* Dr. C. G. ABBOT, of the Smithsonian Institution.

In the preparation of a forthcoming book on the sun the speaker had attempted to explain solar phenomena on the hypothesis that the sun is completely gaseous, and not possessing the shell of clouds generally assumed to constitute the photosphere. The temperature of the sun seems to be of the order of 6500° absolute centigrade, and the pressure in the iron reversing layer about five atmospheres. In these circumstances it seems highly improbable that matter other than gaseous exists. A continuous spectrum was held by the speaker to be the natural consequence of the immense thickness and considerable pressure of the radiating gas sphere. A sharp boundary exists because the molecular scattering of light prevents the view at the center of the sun's disc from penetrating more than perhaps one thousand kilometers. A view at the sun's edge will be oblique, and to furnish gas one thousand kilometers thick

there will mean a thickness radially of only perhaps one hundred kilometers, which implies an indistinctness of outline of less than a half second of arc, which is not discernible. In consequence of the deeper source of the observed radiation the effective temperature of the source at the center of the sun's disc exceeds that at the sun's edge. Hence the intensity of the radiation falls off from the center to the edge. The diminution of the effective temperature of the source affects short wave rays more powerfully than longer ones, hence the contrast between edge and center is greater for violet than for red, as long known. The granulation of the sun's disc the speaker regarded as evidence of slight differences of temperature from place to place, with attending differences of radiation. He called attention to the fact that such differences of brightness appear most strongly in spectroheliographic photographs with the red hydrogen line, where of course it is out of the question that the effect is due to the precipitation of a cloud. But it is stated by some that the juxtaposition of the gases to empty space must necessarily cause a precipitation of a cloud by cooling. The speaker drew attention to the existence of water vapor without clouds in many regions of the earth's atmosphere, and to the existence of steam without a cloud for some distance above the stack of a locomotive. The question of cloudy precipitation depends upon the rate of supply of heat to take the place of energy radiated away, and on the rate of change of density of the gas at the boundary. A cloud is not a necessity. Many other points were discussed.

(The foregoing abstracts are by the respective authors of the papers.)

R. L. FARIS,  
*Secretary*

#### THE GEOLOGICAL SOCIETY OF WASHINGTON

At the 238th meeting of the society, held at the Cosmos Club on Wednesday evening, January 25, 1911, under informal communications, Mr. C. W. Hayes exhibited a series of specimens illustrating the growth of concretions of different composition under a variety of conditions.

(a) Calcite concretions from the famous Dos Bocas oil well, south of Tampico, Mexico. This well now forms a great caldron about 36 acres in extent. The ebullition due to the escape of gas, which a year ago was continuous, is now intermittent, having a period of about two hours. The well still yields a large quantity of hot (160° F.)

salt water heavily charged with lime and a small amount of heavy oil in the form of a frothy emulsion. The water deposits lime carbonate partly in concretionary form. The concretions, from .5 to 1.5 inches in diameter, being kept in motion by the ebullition in the caldron are almost perfect spheres, made up of very thin concentric layers.

(b) Bauxite concretions from the Rome district in northwest Georgia. The formation of these deposits has been ascribed to hot-spring action and the conditions during their deposition were probably analogous to those seen in the Dos Bocas well. Instead, however, of being charged with lime in solution, the water contained aluminum hydroxide in suspension and this was deposited in concentric layers forming the bauxite concretions.

(c) Calcite concretions from San Antonio, Tex. These occur in great abundance in the "telpetate" or "caliche," a widespread chalky limestone formation, produced at or near the surface in semi-arid limestone regions by the ascent of water through capillary action and evaporation with deposition of the dissolved salts. Ordinarily the deposit has a platy structure, but in places, as at San Antonio, it is strongly concretionary.

(d) Bauxite concretions from the Little Rock district, Ark. These deposits are similar in form and possibly analogous in origin to the telpetate of San Antonio. The concretions are nearly indistinguishable from those of San Antonio, although entirely different in composition.

#### *Regular Program*

*The Topographic Development of the Catskill Mountains:* H. E. MERWIN.

The Catskill Mountains and the adjacent region have the structure of a coastal plain with a very resistant thick member at the top. The Hudson-Mohawk valley developed as a subsequent valley in the weaker lower member that outcropped along the borders of the Adirondack-Taconic old land. The Hudson became superposed upon the complex structure of the Highlands which were buried beneath the coastal plain series. This river seems to have had its course well established by the close of the Paleozoic so that it was antecedent to the folded structure beneath and east of the Catskills.

The topography of the northeastern Catskills, though originally of the peak-and-spur type characteristic of mature plateaus, is now strongly influenced by the southward dip of the rocks. The drainage of this part of the Catskills was originally westward through the Delaware and Susque-

hanna rivers, but long after the uplift of the Cretaceous peneplain the Schoharie captured this drainage.

In the southern and western Catskills the streams are still working in massive rocks, developing the plateau type of topography.

*The Iron Ores of Sweden:* WALDEMAR LINDGREN.

Mr. Lindgren discussed nature and origin of the principal iron ore deposits and exhibited numerous specimens.

EDSON S. BASTIN,  
Secretary

#### THE BOTANICAL SOCIETY OF WASHINGTON

THE 71st regular meeting was held at the Cosmos Club, Tuesday, March 7, 1911, at 8:00 P.M. President W. J. Spillman presided. Thirty-two members were present. Mr. H. C. Skeels was elected to membership.

Mr. W. A. Orton discussed current dictionary definitions of the term "genetics" and showed that the usage attributed to Ward in the new Century is faulty, as that author proposed the term as an antithesis of "telics" and did not extend it to other phenomena of evolution. The usage in the new Webster was held to be faulty in that it does not convey the new view point of scientific experimentation. The term was thus newly defined: "*Genetics*—the application of scientific methods to the study of evolutionary problems; the investigation, in an exact manner and by experimental means, of the facts pertaining to heredity, variation and allied subjects."

The following papers were read:

*Studies of the Life History of the Head Smut of Sorghum:* ALDEN A. POTTER.

Attempts at preventing this smut by seed treatments have failed. Numerous inoculation experiments have been performed, but neither local infection, as in corn smut, seedling infection, as in the kernel smuts, nor floral infection, as in the loose smuts of barley and wheat, has been demonstrated. No theory of local infection can be entertained, however, since detailed histological study has shown that the host plant is affected as a whole. Since the infection is general, then, it must take place at an early stage.

Peculiar floral alterations were shown to be caused by the smut and to contain the smut mycelium, and it was suggested that some grains may develop with the fungus in them and the smut, therefore, be hereditary as is the fungus in certain *Lolium* species.

*Dimorphic Leaves of Cotton and Allied Plants:* O. F. COOK.

This paper reported the existence of a definite dimorphism of leaves in an Egyptian variety of *Hibiscus cannabinus*. The basal leaves are simple, but there is an abrupt transition to deeply lobed leaves near the middle of the stalk. A second Egyptian variety has all the leaves simple. Parallel variations of leaf-forms exist in cotton, okra and *Ingenhousia*, a wild relative of American upland cotton, found in Arizona and Mexico. The so-called okra varieties of upland cotton, with narrow-lobed leaves, correspond to the dimorphic Egyptian variety of *Hibiscus cannabinus*. Hybrids between okra cottons and broad-leaved varieties have shown intermediate forms of leaves in the conjugate generation and Mendelian segregation in the perjugate generation. Dimorphism and Mendelism were treated as analogous forms of alternative expression of characters, the current theory of alternative transmission being considered unnecessary.

*Plant Remains Composing Coals:* DR. R. THIESSEN.

A brief review of the literature on the microscopic investigations of coals was given, in which the views of Bertrand and Renault and Potonié were dwelt upon.

Since every interpretation of any investigation must agree with every known scientific fact, in the present investigation on coal the structure, organization, morphology and chemistry of the living as well as of fossil plant forms had to be considered. Plant components of coals may be divided into two classes: those less resistant to chemical agencies, and those less easily or very difficultly attacked by such agencies. Among the latter class may be recounted the lignocelluloses, the true celluloses, the cuto-celluloses, especially the leaf cuticles, spore- and pollen-exines, the resins and the waxes. It has been found that the coals are composed in a large proportion, if not entirely, of this class.

The lignites are composed approximately of from 75 to 85 per cent. of stems, branches and twigs, almost entirely of coniferous origin, in a very much vertically compressed and changed condition, the interstices being filled in with a plant refuse, analogous to a recent black peat, in which resins, pollen-exines, spore-exines, cuticles and waxes form an important part. These constituting a crystalloid component are imbedded in a colloidal substance, mainly a derivative of cellulose. Here as in all the coals, nothing but the outer wall or

exine of the spore- and pollen-grains is now left, and of the leaves nothing but the cuticle, rarely the epidermis, is left.

The brown-coals from Lester, Ark., are composed of a "débris" only, in which the crystalloid components form a very large proportion; fern spore-exines also are very abundant. To these constituents must be ascribed the oil-yielding properties of this coal.

In the bituminous coal from Exeter, Ill., the "wood" is represented mainly by thin, jetty, black, lamina, between which is found a component closely resembling the débris of the younger coals, having as a ground substance a much macerated woody or colloidal material in which a greater proportion of crystalloid substances are imbedded. All the elements found in the younger coals and also megaspores are represented. The bituminous coal from Shelbyville is very similar but has a much greater proportion of crystalloid material, megaspore-exines and cuticles.

The cannel coals examined are composed almost entirely of spore-exines of a variety of forms; resins and cuticles are present only in a very subordinate amount. The so-called binding matter in the interstices of the spore-exines is distinctly composed of two kinds of substances, one more or less homogeneous, colloidal in nature, and the other more or less granular, the fragmentary residue of spore-exines.

The algal theory of Bertrand and Renault, and the sapropellic theory of Pontonié were rejected as being undemonstrable in every particular. The bodies supposed to be algæ can be shown not to be algæ, and all but one kind have unmistakably been proved to be the exines of certain spores, either of Pteridophytes or Cycadofilicales or both. A gelosic substance, such as the algal theory calls for, is entirely absent.

W. W. STOCKBERGER,  
*Corresponding Secretary*

#### THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON

At the 452d meeting of the board of managers, held March 23, 1911, the following resolutions submitted by the undersigned committee were adopted by the board and ordered published in SCIENCE:

"Acting on the information furnished by one of its members, Dr. Aleš Hrdlička, in regard to the wholesale destruction of antiquities in all parts of Peru, as well as in other regions of South America, the Anthropological Society of

Washington has, after due consideration, resolved that:

"1. The remains of American aborigines, wherever met with, and particularly in such countries as Peru, where native civilization reached high standards, are historical records of definite branches of the human family and, as such, are of great value to science, to the country in which they exist and to mankind in general.

"2. In view of such value of the remains in question, which include all manifestations of human activity, and also the associated skeletal parts of man himself, the destruction of these records is deprecated and the hope is expressed that scientific men and societies, as well as the proper authorities, will counteract the same as far as possible."

W. H. HOLMES,  
A. HRDLÍČKA,  
WALTER HOUGH,  
*Committee*  
I. M. CASSANOWICZ,  
*Secretary*

#### THE AMERICAN PHILOSOPHICAL SOCIETY

DR. F. M. JAEGER, professor of inorganic and physical chemistry and head of the department of chemistry in the University of Gröningen, Holland, gave an illustrated lecture "On Fluid Crystals and Anisotropic Liquids" before the American Philosophical Society on March 3. He explained why this question was one of the most ardently discussed problems of physical chemistry at present; how the old conception as to the molecular movement of the liquid state can not hold in the face of the newly discovered facts. He pointed out the close analogy between these phenomena and the polymorphic changes of matter and discussed the properties of substances melting successively to two, three or more liquid states. He demonstrated the principal physical properties of the above substances, their birefringence, magnetic induction, surface-tension and circular polarization. He discussed the so-called "emulsion theory" and proved its valuelessness for the explanation of the different phenomena.

In short, it is proved now undoubtedly that liquids can share the characteristic properties of crystalline matter and that they display phenomena which indicate a regular molecular movement in the liquid state. The whole subject is of the highest importance both for physics and for chemistry.